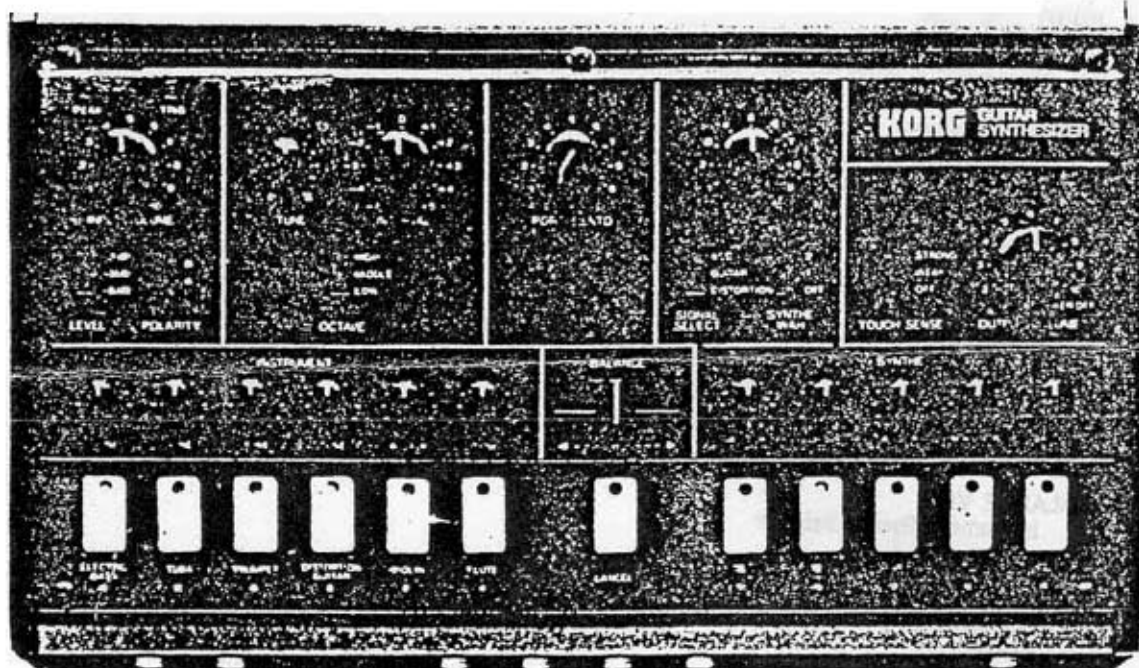




MONOPHONIC GUITAR SYNTHESIZER SERVICE MANUAL

X-911

CONTENTS

1. SPECIFICATIONS	2
2. BLOCK DIAGRAM	3
3. CIRCUIT DIAGRAM	
KLM-229	4
KLM-229	5
KLM-228	6
KLM-228	7
4. PC BOARD	
KLM-228	8
KLM-229	9
5. STRUCTURAL DIAGRAM	10
6. CHECK AND ADJUSTMENT	11
7. PARTS LIST (Mechanical parts not listed)	12

1. SPECIFICATIONS

1. INPUT SECTION

Input Volume -20dB, -35dB, -50dB
 Input Level (Attenuator) A, B
 Input Polarity

2. TUNING SECTION

Fine Tune ± 100 cent
 Interval ± 1200 cent
 Octave Switch 3 OCT

3. PORTAMENTO

4. INSTRUMENT SECTION

INSTRUMENT	SCALE	CONTROL
Electric Bass	16'	Cutoff Freq.
Tuba	16'	Cutoff Freq.
Trumpet	8'	Cutoff Freq.
Distortion Guitar	8'	Tone
Violin	8'	Attack
Flute	4'	Tone

5. BALANCE VR

Instrument, Synthe Balance

6. CANCEL

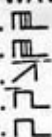
Instrument, Synthe Part All Cancel

7. SYNTH SECTION

ENVELOPE



WAVE FORM



SCALE

CONTROL

ENVELOPE	WAVE FORM	SCALE	CONTROL
1	1	16'	Attack
2	2	16'	Decay
3	3	8'	Attack
4	4	8'	Cutoff Freq. Attack
5	5	4'	Decay
6	6		VCO, Guitar, Distortion
Signal Select Switch			
VCF Cutoff Freq.			Off, 1, 2
Synth WAH Switch			

8. TOUCH SENSE

Touch Sense Switch Off, Weak, Strong

9. OUTPUT VOLUME AND POWER SWITCH

10. JACK

Input Signal
 Direct Output
 Effect
 Interval
 Portamento
 Hold
 ON/OFF
 Output
 CV Out Hz/V
 CV In Hz/V
 Trig Out $\rightarrow$ GND
 Trig In $\rightarrow$ GND
 FM In
 Synthe VCF FcM In

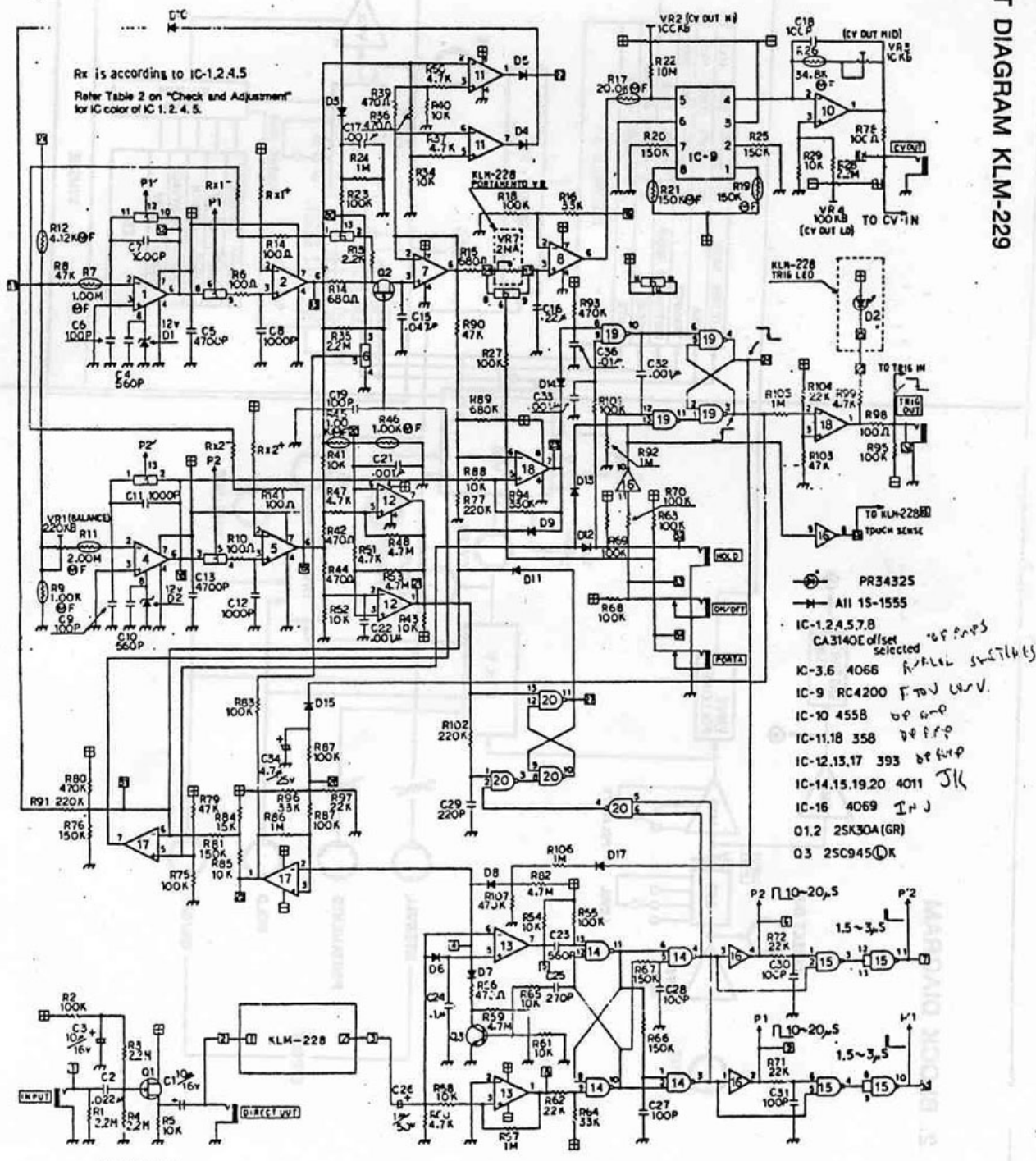
11. POWER CONSUMPTION

5 Watts, Local Voltage 50/60 Hz

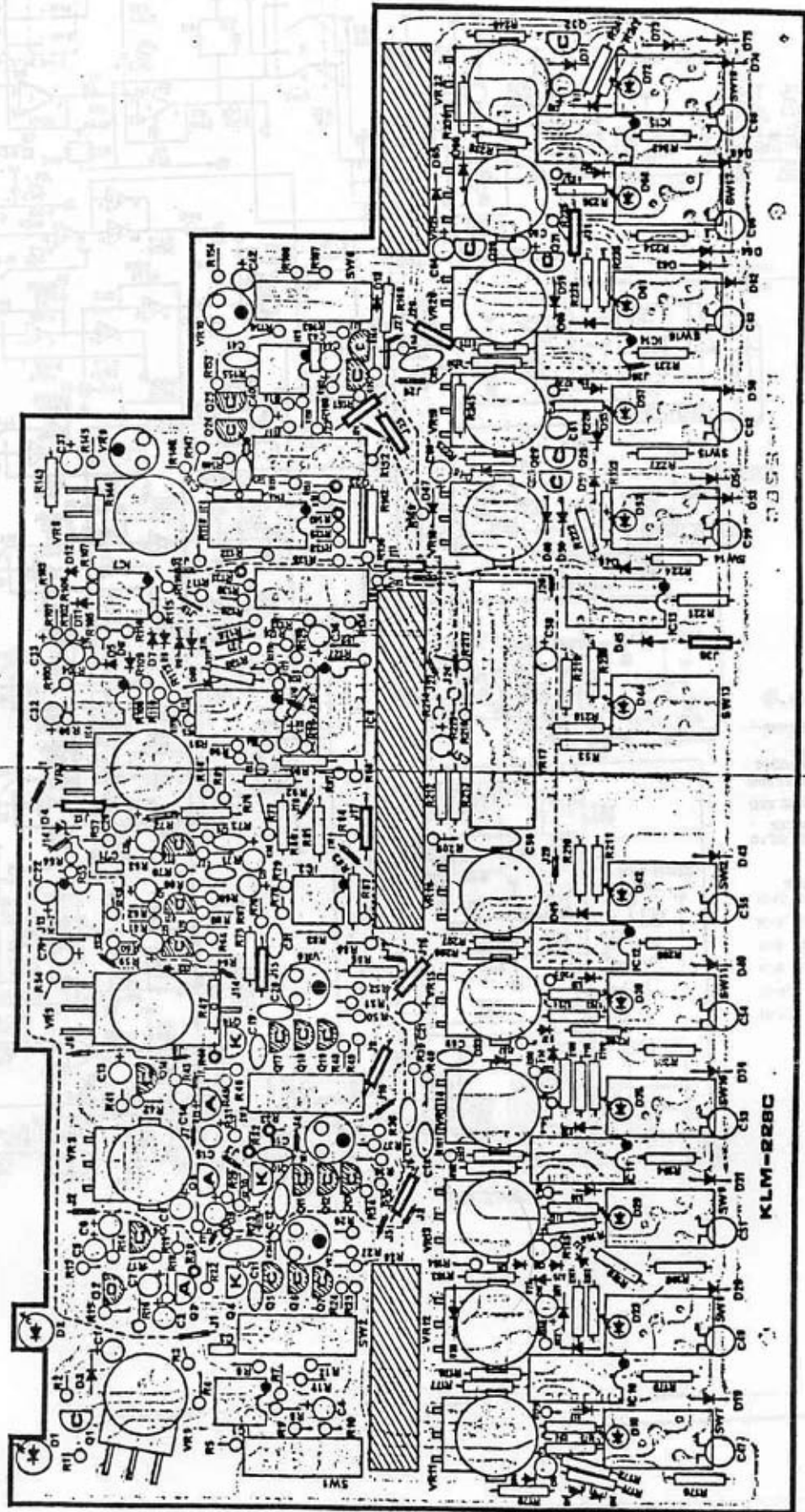
12. DIMENSIONS

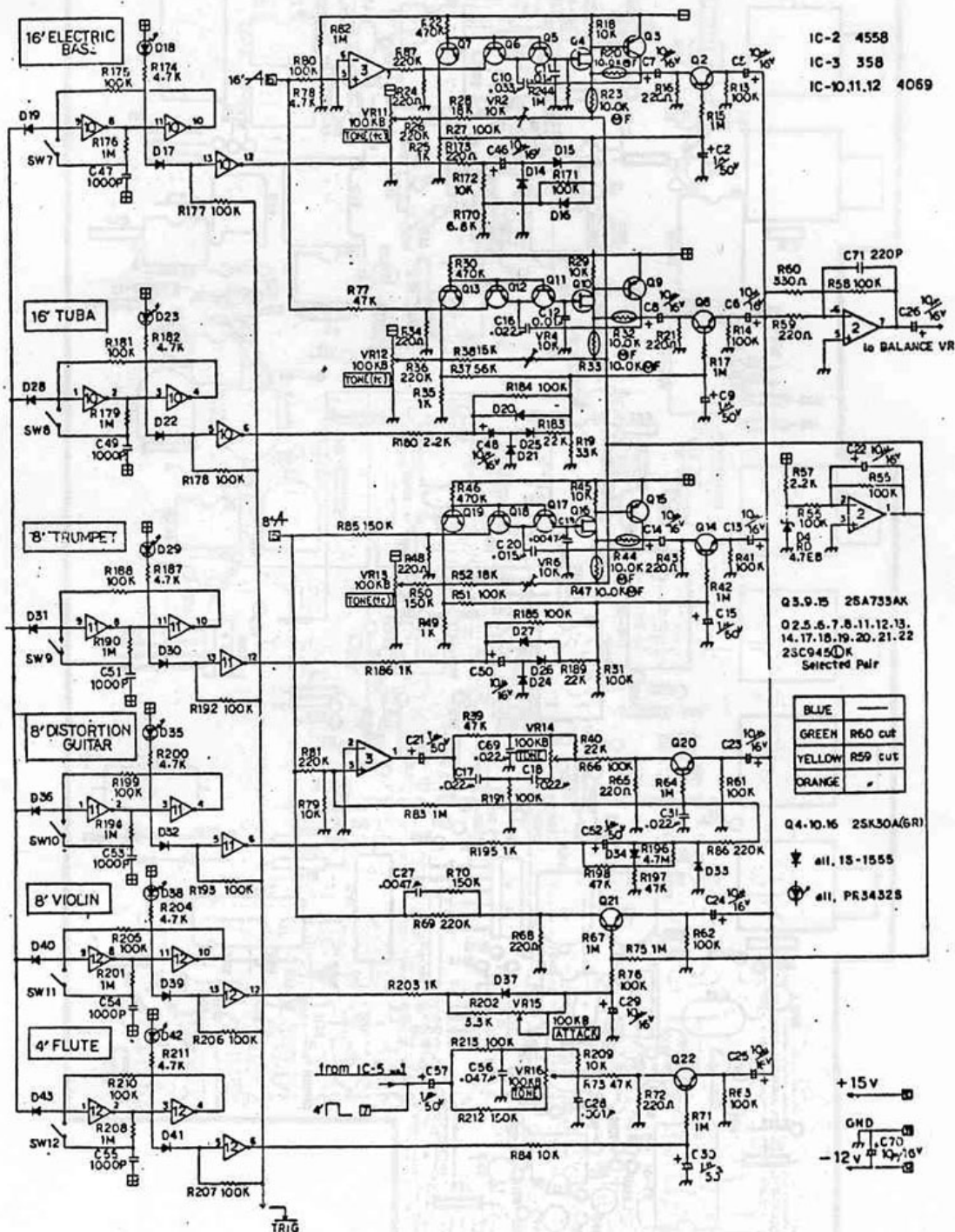
336 x 200 x 81.5 (m/m)

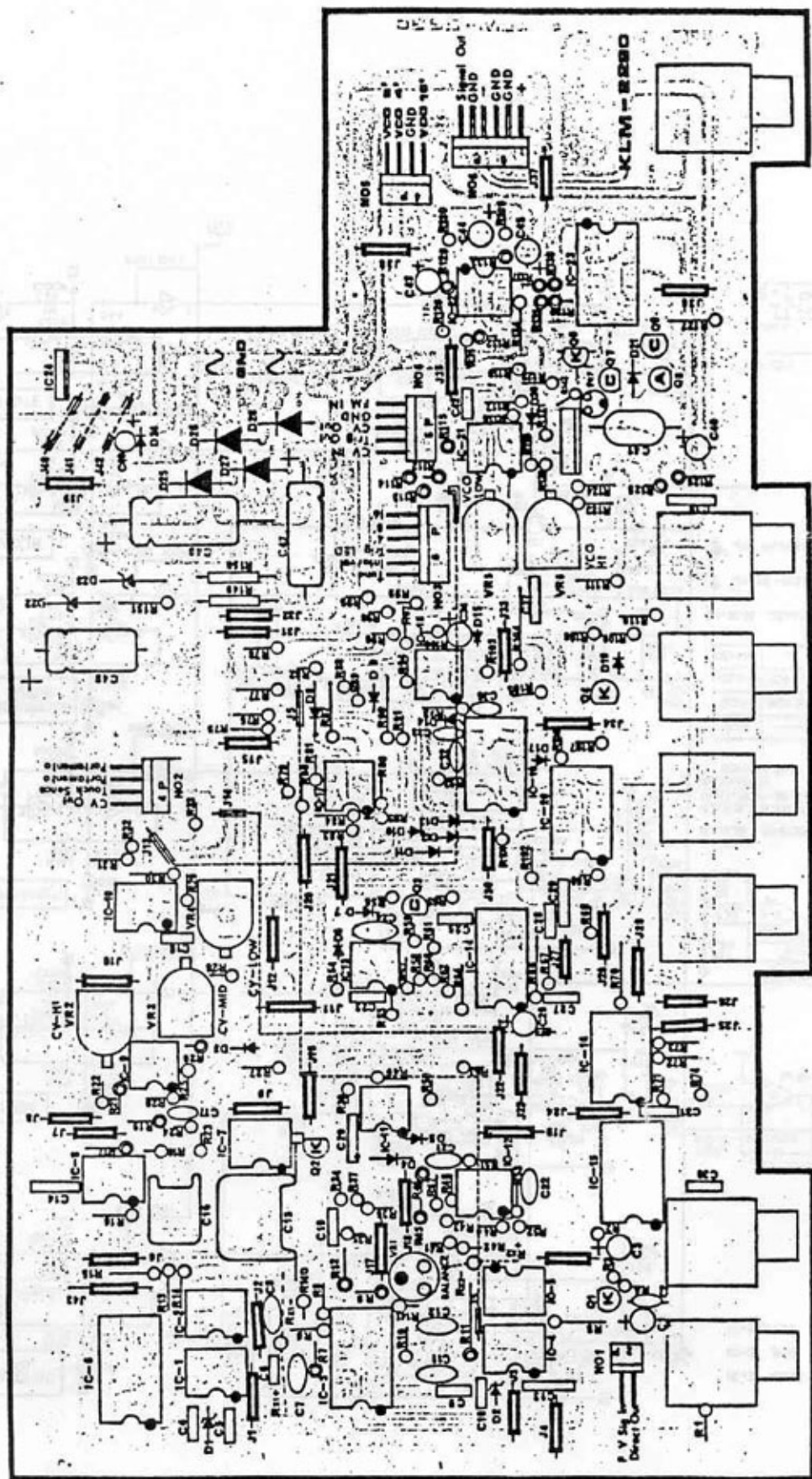
Wave Generation

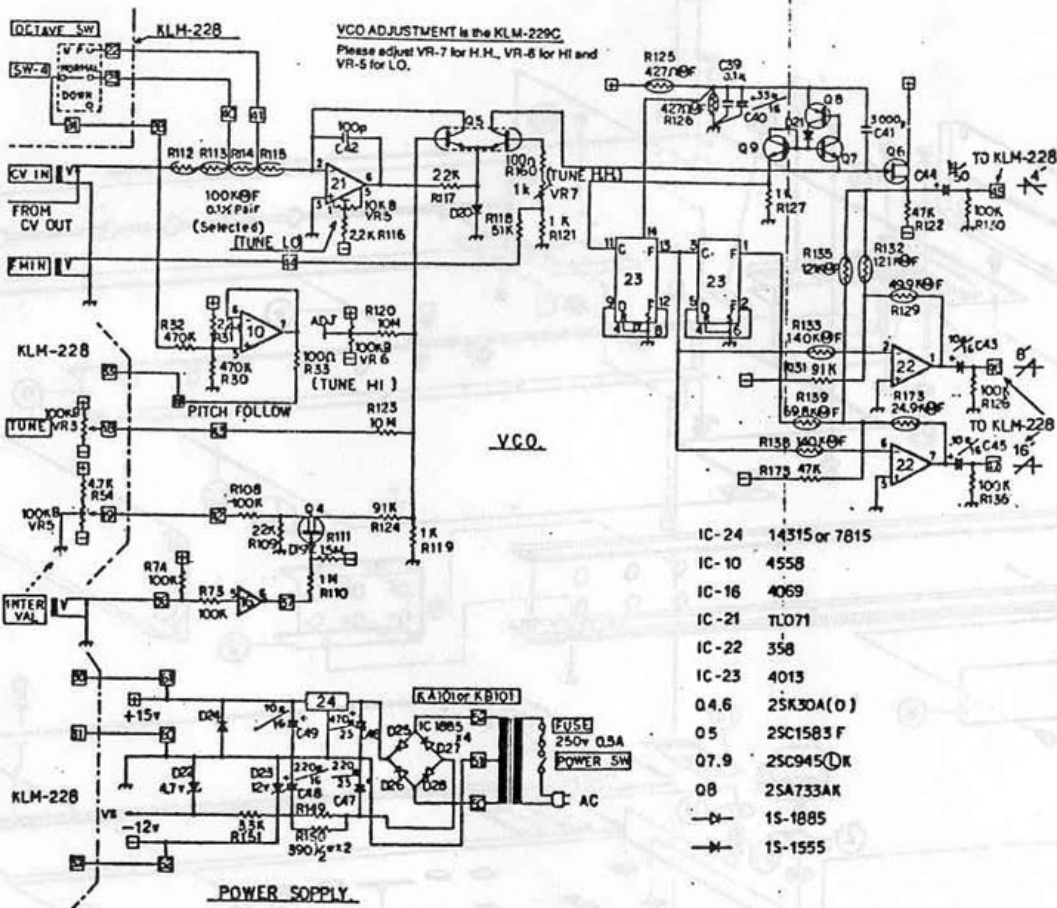


4. PC BOARD KLM-228

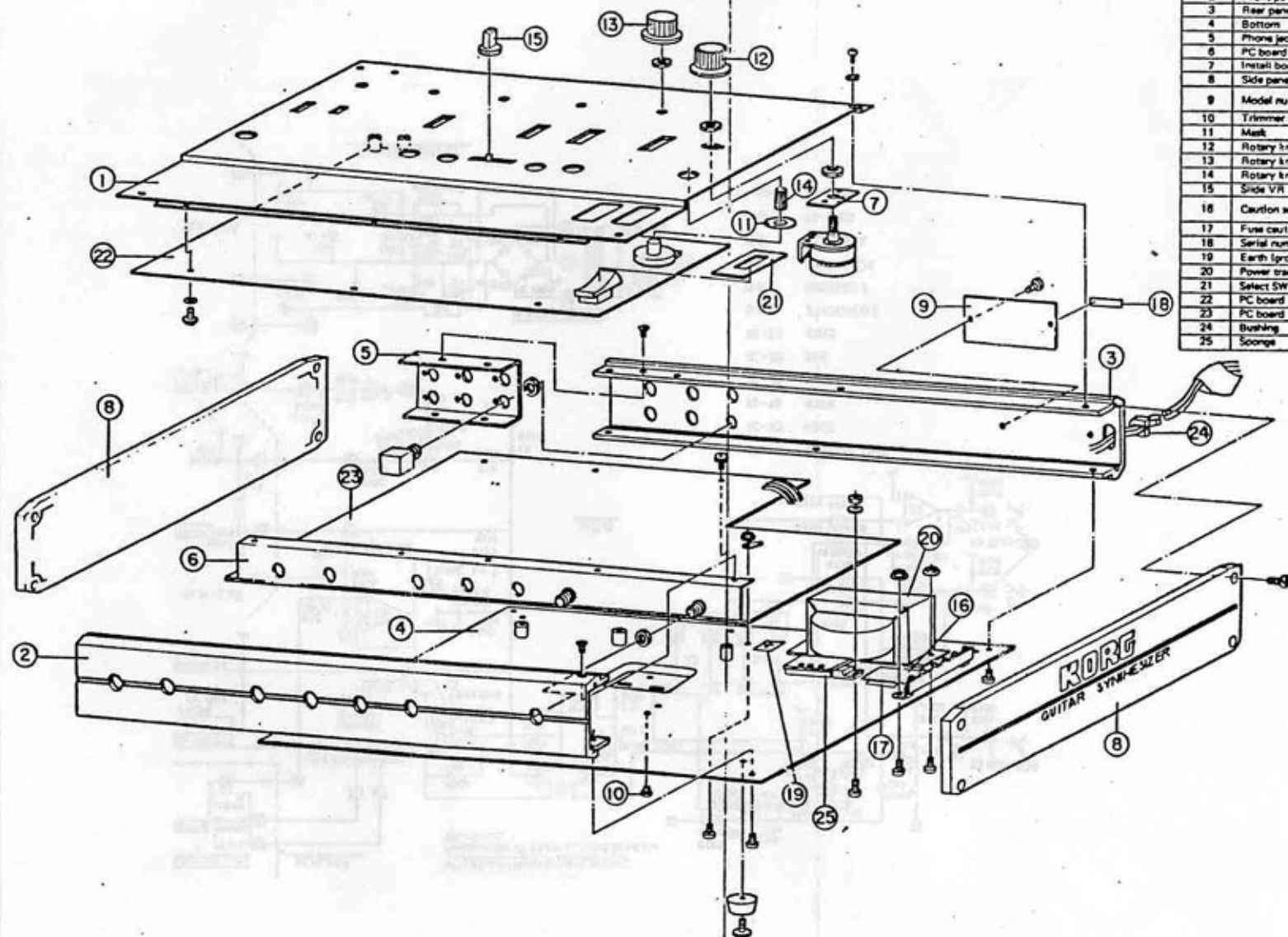








5. STRUCTURAL DIAGRAM



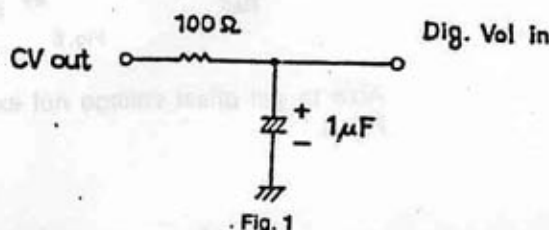
Item	Part Name	Remarks
1	Main panel	KOC-C20080
2	Front panel	KOC-C20078
3	Rear panel	KOC-C20079
4	Bottom	KOC-C30122
5	Phone jack mounting board	KOC-C40247
6	PC board mounting board	KOC-C20248
7	Install board for potentiometer	KOC-C40249
8	Side panel	KOC-E20020
9	Model number plate	KOC-40145, KOC-40144
10	Trimmer stopper	KOC-F40047
11	Mask	X-0600
12	Rotary knob	X-1009
13	Rotary knob	X-1936
14	Rotary knob (small)	X-1070
15	Side V.R. knob	KOC-E40036
16	Caution seal	HAZARD CAUTION
17	Fuse caution seal	KOC-F40057 No.3
18	Serial number plate	KOC-F40050
19	Earth (ground) seal	X-1942
20	Power transformer	KA101, K8101
21	Select SW mask	KOC-F40099
22	PC board	KLM-228
23	PC board	KLM-229
24	Bushing	KOC-F40082 No.1
25	Scoring	X-1902

6. CHECK AND ADJUSTMENT

Adjustment No. 1

N.B. Add the FG-1 circuit to INPUT of Digital Volt Meter in order to prevent an error which will be caused by direct connection of DIGITAL VOLT METER to CV OUT.

1) CV Adjustment



Setting No. 1 (X-011)

Sig In.....	WT-10A OUTPUT
Violin.....	On
8'.....	On
Sig Selector.....	VCO
CV Out.....	Dig. Vol 4-1/2

Setting No. 2 (WT-10A)

M/S.....	Sound
Chromatic.....	E
Meter.....	0 cent
Octave.....	M

Input Level Setting (X-911)

Level.....	-20dB
Polarity.....	A or B (both approval)

Set "Oct Sw" of WT-10A to "H" and adjust "INPUT VOL" and fix TRIG at the point of "ON". Turn "OCT SW" to "L" from "H" in order, and confirm that each voltage indication of DIG VOL changes.

a. Slope Adjustment Ref. FIG. 2

Adjust to 2.637V by Vr-3 as per above setting.

b. Off Set Adjustment

Adjust to 1.318V by Vr-4 as per OCT SW to L.

c. High Adjustment

Adjust to 5.274V by Vr-2 as per OCT SW to H.

Repeat a. b. c. several times and adjust to be same voltage.

Figures should be following listed numbers on each position.

WT-10A OCT SW	DIGITAL VOLT METER	ALLOWANCE
H	5.274	5.271 5.277
M	2.637	2.635 2.639
L	1.318	1.3172 .. 1.3188

2) VCO Adjustment

Setting

Signal Selector.....	Guitar
Signal Out.....	AMP
Balance.....	Center
Oct Switch.....	Middle
Interval.....	0
Tune.....	Center

a. HI Adjust:

Set Oct SW of WT-10A to H and adjust Vr-6 to stop beat.

b. LO Adjust:

Set Oct SW of WT-10A to L and adjust Vr-5 to stop beat.

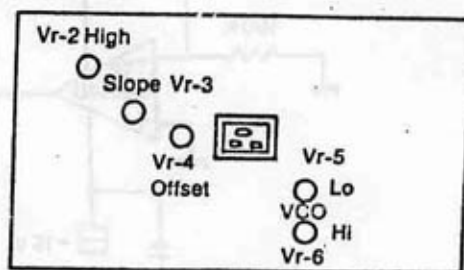


Fig. 2 Rear Pannel

Adjustment No. 2

(Adjustment after repair)

1. F/V Balance; Replacement of ICs 1, 2, 4, 5, on KLM-229

Adjust Vr-1 to half level of voltage test point 19 against test point 13 on KLM-229 by DIG VOL under "INPUT...440 Hz" condition.

2. SYNTH FC Replacement of IC-8 on KLM-228.

Settings

X-911	WT-10A
Synth Wah.....	2 Oct.....
Sig Select.....	VCO M/S.....
VCF Fc.....	5 Chromatic.....
OUT.....	Oscillo Scope Meter.....
Input.....	WT-10A 0 cent
Select SW.....	
8' FC attach 0	

Adjust Vr-9 to be 0.5ms (2 Hz) on above setting.
Confirm sound itself referring to owner's manual for
other adjustment.

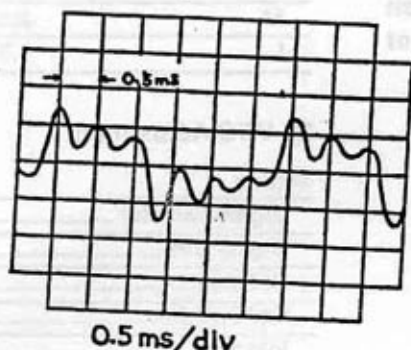


Fig. 3

CA 3140E off set select

Fig. 4 is the circuit to simplify of adjustment and to get
rid of inoperation by difference of adjustment.

$$VIOs = \frac{VO}{10}$$

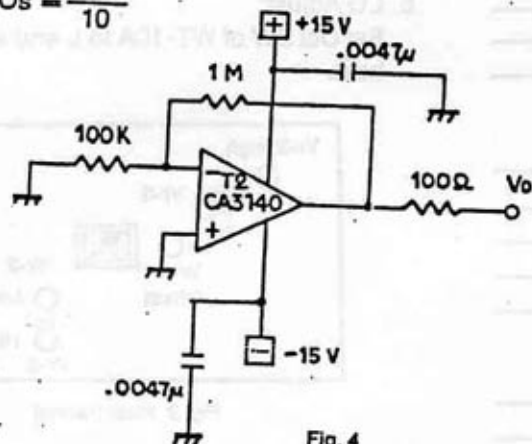


Fig. 4

IC is separated each following mentioned color de-
pends on the value of VIOs.

VIOs (mV)	Color
13.75 ~ 15.00	Purple White
11.25 ~ 13.75	Blue White
8.75 ~ 11.25	Green White
6.25 ~ 8.75	Yellow White
3.75 ~ 6.25	Orange White
1.25 ~ 3.75	Red White
-1.25 ~ +1.25	White
-1.25 ~ -3.75	Red
-3.75 ~ -6.25	Orange
-6.25 ~ -8.75	Yellow
-8.75 ~ -11.25	Green
-11.25 ~ -13.75	Blue
-13.75 ~ -15.00	Purple

Table 1

Taken off by each offset

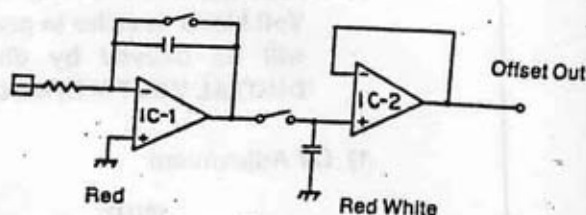


Fig. 5

Able to get offset voltage not exceeding 2.5mV by
Fig. 5.

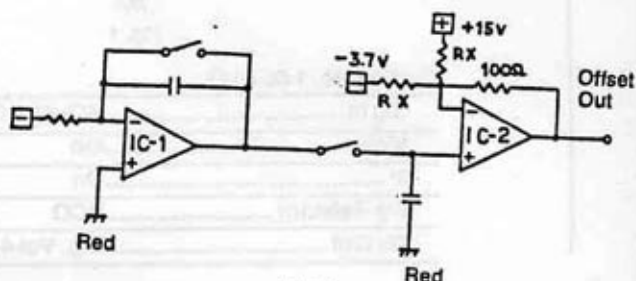


Fig. 6

Able to correct by using RX when you have to use
Fig. 6. Namely offset voltage should not be exceeded
2.5mV on output.

Use above method for IC-1, 2, 4, 5.

Small voltage is desirable on IC-7, 8. However, the
above voltage not exceed 7mV is allowed.

IC-1 or 4		IC-2 or 5	
Offset V	Color	Offset V	Color
-6mV	Purple	+6mV	Purple White
-5mV	Blue	+5mV	Blue White
-4mV	Green	+4mV	Green White
-3mV	Yellow	+3mV	Yellow White
-2mV	Orange	+2mV	Orange White
-1mV	Red	+1mV	Red White
-0mV	White	+0mV	White

Table 2 IC COLOR LIST

7. PARTS LIST

(Refer to structural diagram for parts list)

● CARBON RESISTORS not listed

● SOLID RESISTORS 1/4W 10M Ω (K) x 5

● METAL FILM RESISTORS

1/4W 427 Ω (F) x 2
1.00K Ω (F) x 5
4.12K Ω (F) x 1
10.0K Ω (F) x 5
20.0K Ω (F) x 1
24.9K Ω (F) x 1
34.8K Ω (F) x 1
47.5K Ω (F) x 1
49.9K Ω (F) x 1
69.8K Ω (F) x 1
100K Ω (F) x 4
121K Ω (F) x 2
140K Ω (F) x 2
150K Ω (F) x 2
1.00M Ω (F) x 1
2.00M Ω (F) x 1
10.0K Ω (F) x 1
47.5K Ω (F) x 1

● MYLAR CAPACITORS

50V - 0.001 μ F(K) x 5
0.01 μ F(K) x 1
0.022 μ F(K) x 1
0.1 μ F(K) x 1
0.22 μ F(Kp) x 1

● CERAMIC CAPACITORS

25V - 0.1 μ F(K)ZfZ x 1
50V - 220pF(K) x 1
270pF(K) x 1
560pF(K) x 3
1000pF(K) x 11
4700pF(MD) x 5
100pF x 11

● ELECTROLYTIC CAPACITORS

16V-10 μ F x 5
33 μ F x 1
25V - 4.7 μ F x 1
50V - 1 μ F x 2
16V - 220 μ F x 1
25V - 220 μ F x 1
470 μ F x 1
16V - 10 μ F x 21
50V - 1 μ F x 16
25V - 4.7 μ F x 2

● POLYSTYRENE CAPACITORS 50V - 3000pF(G) x 1

● POLYPROPYLENE CAPACITORS DC 100V - 1000pF(G) x 4 200V - 0.047 μ F(M) x 1

● MYLAR CAPACITORS DC 50V - 0.001 μ F(K) x 2

0.0047 μ F(K) x 2
0.01 μ F(K) x 3
0.015 μ F(K) x 1
0.022 μ F(K) x 6
0.033 μ F(K) x 1
0.047 μ F(K) x 2

● TRANSISTORS

2SA - 733AK x 4
798F or G x 1
945(L)K x 9
945(L)K x 19
(special selected)
1583F x 1

● FET

2SK - 30A TM-GR x 5
TM-O x 2

● DIODES

1S - 1555 x 79
1885 x 4

● LED

PR - 3432S x 14

● ZENER DIODES

RD - 4.7EB2 x 2
12EB2 x 3

● IC

324 x 1
358 x 6
393 x 3
4011 x 4
4013 x 1
4066 x 2
4069 x 7
4558 x 4
7815(NEC14315) x 1
CA - 3140E x 6
(offset special selected)
RC - 4200 x 1
TL - 071 x 1
LM - 13600N x 1

● SELECT SW

320.2 White x 6
Yellow x 5
Orange x 1

● SLIDE SW

ESD - 32132 x 1
32131 x 5

● PHONE JACKS

SG - 7622 x 7
7501 x 4
7617 x 2

● TERMINAL BOARD

No. 9 - 2L4P x 1

● FUSE

0.5A - 250V x 1

● SEMI-FIXED RESISTORS

SR19R 10K x 3
100K x 2
220K x 1
WHS-512A 1K Ω (B) x 1
EVL-S6A A00 B14 x 2
B15 x 3

● ROTARY VARIABLE RESISTORS

EVH-LOAS20 B15 x 7
A16 x 5
EVH-5LA 814 B15 x 2
A26 x 1
EVC-BQ5P 18 B14 x 1
EVH-6LA 814 B15 x 1

● SLIDE VARIABLE RESISTORS

LFE - 9R 533 1KB x 1

● CONNECTOR

GS-1101 x 1
GS-1102 x 1
GS-1103 x 1
GS-1104 x 1
GS-1105-1 x 1
GS-1106 x 1
MLR-03 TRC-1 x 1
TRC-50 x 1
BS-2P-SHF-1 x 1
BS-4P-SHF-1 x 2
BS-5P-SHF-1 x 1
BS-6P-SHF-1 x 2

● PRINTED CIRCUIT BOARD

KLM-228 x 1
KLM-229 x 1